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T-274 P.005/020 F-546

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference MB/J46794WO	<b>FOR FURTHER ACTION</b> see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/GB2004/002808	International filing date (day/month/year) 30/06/2004	(Earliest) Priority Date (day/month/year) 30/06/2003
Applicant VOLLER ENERGY LIMITED		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 8 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. ☐

With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐

Certain claims were found unsearchable (See Box II).

3. ☐

Unity of Invention is lacking (see Box III).

## 4. With regard to the title,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

## 5. With regard to the abstract,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 33.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

## 6. With regard to the drawings,

- a. the figure of the drawings to be published with the abstract is Figure No. 3



as suggested by the applicant.



as selected by this Authority, because the applicant failed to suggest a figure.



as selected by this Authority, because this figure better characterizes the invention.

b. ☐

none of the figures is to be published with the abstract.

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB2004/002808**Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

## 1. claims: 1-12, 22-34 and 35-47

see 1.1, 1.2 and 1.3 below

## 1.1. claims: 1-12

A fuel cell system comprising a portable casing, a fuel cell stack mounted in said casing, a mounting for a fuel canister in said casing and a mounting for electrical components in said casing, the arrangement being arranged such that said fuel cell, electrical components and a fuel canister mounted to said fuel canister mounting are in stacked relationship, whereby, in use, heat from said electrical components and fuel stack can rise to heat said fuel canister.

## 1.2. claims: 22-34

A fuel cell system comprising a fuel cell stack, means for mixing to a variable extent oxygen-depleted air output from the stack with air having a greater oxygen content to provide an air mix for input as fuel to the stack, and means for supplying said air mix to the stack.

## 1.3. claims: 35-47

A fuel cell system comprising a fuel cell stack, apparatus for extracting water from a stream of relatively water-rich oxygen-depleted air output from the stack, and means for facilitating the evaporation of said extracted water.

## 2. claims: 13-17, 48-51

A fuel canister for use with a fuel cell system, the canister comprising means operable to record data relating to the amount of fuel in the canister and  
A method for estimating the amount of fuel in a fuel canister of a fuel cell system, the method comprising the steps of: reading data from the canister, said data comprising an indication of the power that may be drawn from a fuel cell system using all the fuel in the canister; monitoring the power consumed by an external appliance when the fuel cell system is in use with that canister; and estimating the amount of fuel remaining in the fuel canister by subtracting the power consumed from the power data read from the canister.

## 3. claims: 18-19

18-12-2005 11:25

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T-274 P.008/020 F-546

International Application No. PCT/ GB2004/ 002808

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Inhibit supply of hydrogen during start-up until sufficient air has been supplied to the stack and flushing of residual hydrogen during shut-down before inhibiting supply of air to the stack.  
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4. claims: 20-21

A fuel cell system in which a controller is operable to monitor a voltage produced by a fuel cell stack after start-up, and to selectively inhibit the supply of electrical power to one or more other electrical components of the system until the voltage produced is sufficient to power said one or more components.  
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19-12-2005 11:26

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T-274 P.009/020 F-546

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/GB2004/002808

Box No. IV Text of the abstract (Continuation of item 5 of the first sheet)

A fuel cell system ( 40 ) wherein system components ( stack 50, electronics 52, metal hydride canister 54 ) are arranged to facilitate the transfer of heat from those components ( 50,52 ) which generate heat in operation to those ( 54 ) which cool in operation.

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/GB2004/002808

A. CLASSIFICATION OF SUBJECT MATTER  
H01M8/04 H01M8/06

According to international Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
H01M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)  
EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/114983 A1 (FRANK KENNETH M ET AL) 22 August 2002 (2002-08-22)	1-12, 35-47
Y	paragraphs [0012] - [0016], [0025], [0028] - [0030], [0037], [0041], [0043]	22-34, 48-51
Y	WO 00/63993 A (ZENTRUM FUER SONNENENERGIE- UND WASSERSTOFF-FORSCHUNG BADEN-WUERTTEMBERG) 26 October 2000 (2000-10-26) page 1, lines 14,15 page 5, line 8 - page 6, line 1	22-34
A	EP 0 917 225 A (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD) 19 May 1999 (1999-05-19) the whole document	1-12, 22-47

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "Z" document member of the same patent family

Date of the actual completion of the international search

19 December 2005

Date of mailing of the international search report

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB2004/002808

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 03/032425 A (SONY CORPORATION; WATANABE, YASUHIRO) 17 April 2003 (2003-04-17)	13-17
Y L	abstract & US 2004/067398 A1 (WATANABE YASUHIRO) 8 April 2004 (2004-04-08) Published after priority date, but provided for language reasons. paragraph [0016] - paragraph [0021]	48-51
X	EP 1 306 918 A (HEWLETT-PACKARD COMPANY) 2 May 2003 (2003-05-02) paragraphs [0021], [0036] - [0040]	13-17
A	US 6 551 731 B1 (BERG NORBERT ET AL) 22 April 2003 (2003-04-22) column 6, lines 41-43 column 7, line 10 - line 15 column 9, line 28 - line 40; figure 3	49-51
A	EP 1 253 552 A (HEWLETT-PACKARD COMPANY) 30 October 2002 (2002-10-30) paragraph [0009]; claim 10	13-17, 48-51
X	US 2003/059656 A1 (HORIGUCHI MUNEHISA ET AL) 27 March 2003 (2003-03-27) paragraphs [0023], [0073], [0074], [0079], [0080] figures 1,9,12	18,19
X	DE 101 50 386 A1 (BALLARD POWER SYSTEMS AG) 30 April 2003 (2003-04-30) claim 1	19
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18-12-2005 11:26

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T-274 P.012/020

F-546

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Information on patent family members

International Application No

PCT/GB2004/002808

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